

Lichenoid contact reaction to eugenol presenting as oral lichen planus

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Key words

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Dental materials –
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Introduction

Dental materials are often suspected to be the causative agent in contact allergic reactions [1, 2, 3, 4]. However, typical morphological correlates are not always found in the oral mucosa. Allergic contact stomatitis generally presents clinically as infiltrated erythema with or without erosions. Having said that, contact allergies occasionally present as lichenoid lesions in the oral mucosa; in such cases, it is important to perform a comprehensive allergy diagnosis to identify and avoid the trigger.

Case report

Patient history

A 53-year-old female patient had developed painful mucosal lesions in the maxillary gingiva in the year

prior to presentation. She also reported that a new dental bridge had been fitted near the site of the lesions approximately one year previously. No previous allergies were reported.

Findings

Whitish reticular striae with multiple erosive substance defects (**Fig. 1a**) were visible on the marginal gingiva around teeth 12–16 on the right maxilla and thereby adjacent to the dental bridge (14–16). The adjacent gingiva was normal.

Diagnosis

Immuno-serological tests revealed no evidence of circulating immunoglobulin-G (IgG) autoantibodies to skin components in monkey esophagus or salt-split skin, whilst enzyme-linked immunosorbent assay (ELISA) was negative for IgG autoantibodies against collagen XVII (BP 180) and BP 230, thereby excluding autoimmune bullous dermatosis.

A lesion biopsy (**Fig. 1b**) already taken during a dental consultation (at the dental clinic of Marburg University Clinic) exhibited compact orthohyperkeratosis, irregular acanthosis and epithelial hypergranulosis on hematoxylin-eosin (H&E) staining. A dense band-like lymphoplasmacellular infiltrate causing subepidermal fissure formation was seen at the dermo-epidermal junction zone. Periodic acid-Schiff (PAS) staining demonstrated small fungal elements. Thus the findings showed the typical histological features of oral lichen planus.

Abbreviations

ACE	Angiotensin converting enzyme
DKG	German Contact Allergy Group (Deutsche Kontaktallergie-Gruppe e.V.)
ELISA	Enzyme linked immunosorbent assay
HE	Hematoxylin-eosin
IgG	Immunoglobulin G
LP	Lichen planus
NSAR	Non-steroidal antirheumatic agents
OLR	Oral lichenoid reaction
PAS	Periodic acid-Schiff

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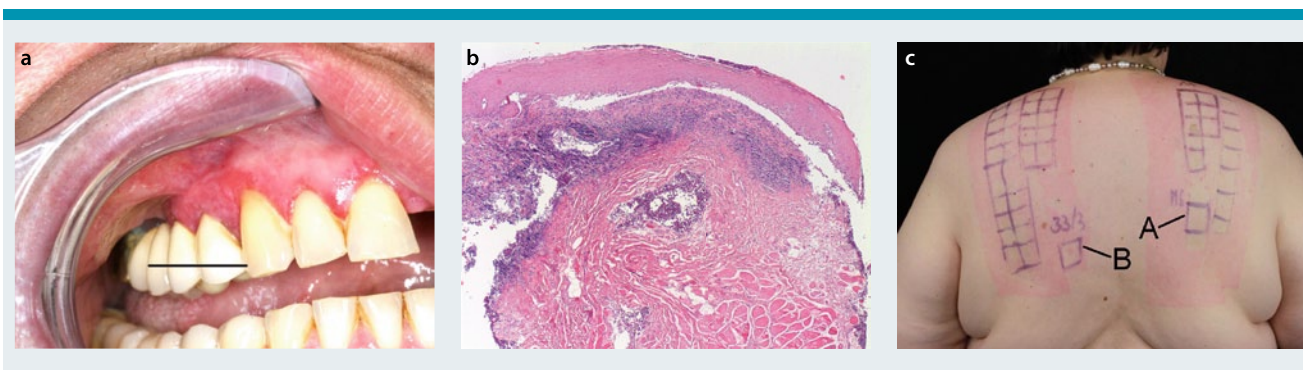


Fig. 1a: Lichenoid lesions on the upper gingiva immediately adjacent to the dental bridge (line). **b:** Histology: basal epidermolysis with focal epidermal hypergranulosis and a band-like lymphocytic infiltrate along the junction zone. **c:** Patch test: negative reaction to the dental prosthesis (A) and positive reaction to eugenol (B)

Frequent triggers of oral lichenoid reactions (OLR) (modified from [5])

Table 1

Contact allergens

- Dental adhesive materials (e.g. acrylates, eugenol)
- Dental metals (e.g. cobalt, copper, chrome, gold, mercury, nickel, silver)
- Other dental materials (e.g. dental composite, porcelain)
- Aromatic substances (e.g. balsam of Peru, cinnamon, eugenol, menthol, vanilla, peppermint)

Medications

- Antibiotic agents (e.g. tetracyclines)
- Anti-seizure agents
- Oral antidiabetic agents
- Antimycotic agents
- Antihypertensive drugs (e.g. β -blockers, ACE inhibitors)
- Antimalarial and antiretroviral drugs
- Chemotherapy drugs (e.g. imatinib)
- Immunomodulatory drugs (e.g. interferon- α)
- Non-steroid anti-inflammatory drugs (e.g. aspirin, ibuprofen, indomethacin, naproxen)
- Antipsychotic agents (e.g. benzodiazepine)

ACE, angiotensin converting enzyme

Allergy testing

Skin testing was performed using: the standard series recommended by the German Contact Allergy Group (DKG, Deutsche Kontaktallergie-Gruppe e. V.); dental metals (Almirall Hermal GmbH, Reinbek); and TempBond™, the cement used for bridge cementation (Kerr GmbH; a zinc oxide eugenol-based temporary cement) in its hardened form, which the patient had been given by the treating dentist. No positive reaction to these test substances was seen at either 48 or 72 h after testing. Since the fixing cement used was zinc oxide eugenol-based, eugenol was also tested as a single substance. A positive reaction consistent with delayed-type sensitization to eugenol was seen 72 h later (**Fig. 1c**).

Diagnosis

Oral lichenoid contact reaction to eugenol.

Discussion

Lichen planus is a rare (prevalence, 0.5%–2%), chronic inflammatory disease of unknown etiology that can affect the skin, mucosa (oral and genital)

and nails [1]. Oral lichen planus, a variant restricted to the oral mucosa, often occurs in women aged between 30 and 60 years. It is characterised clinically by whitish reticular striation and painful erythema and erosions, seen primarily on the buccal and gingival mucosa. Epidermal hypergranulosis and a dense band-like lymphocytic infiltrate in the dermo-epidermal junction zone are observed histologically. Necrosis of basal keratinocytes, which appear as colloid bodies in the basal epidermis, is a further manifestation frequently observed [1].

Although oral lichenoid reaction (OLR) exhibits a similar clinical and histological picture to lichen planus [2, 3], it is etiopathogenetically distinct from the latter in that it represents an immunological hypersensitivity reaction caused by a specific trigger [2]. Triggers may include the systemic use of medication, likely causing OLR via a hematogenous contact reaction on the one hand, or contact allergens that are found by definition up to 1 cm from the OLR site on the other [1, 4] (**Tab. 1**).

The medications that most frequently cause OLR include non-steroidal anti-rheumatic (NSAR), anti-

hypertensive and antiretroviral drugs [1, 5, 6, 7]. Typical contact allergens include dental materials, in particular metals such as mercury-containing amalgam [8, 9, 10, 11], as well as copper and gold [12]. Other potential allergens that can be found in dental materials include fragrances, most notably balsam of Peru, cinnamon, eugenol, peppermint and menthol [1, 13, 14, 15]. Eugenol, an aromatic substance extracted from clove leaves, is frequently used in dentistry in the form of zinc oxide eugenol cement due to its antiinflammatory and antibacterial properties; it also has a contact sensitizing effect [16, 17, 18]. The literature describes oral lichen reactions caused by a contact reaction to eugenol [16].

The present case study emphasizes the significance of possible contact reactions in the development of lichenoid mucosal lesions. Thus, in the case of suspected OLR, possible triggers should be sought both clinically and in the patients' history in a first step, followed by appropriate allergy diagnosis using patch tests [1, 2]. In addition to certain drugs (**Tab. 1**), primarily dental materials that have been used directly adjacent to clinical lesions should be taken into consideration.

Interestingly, our patient reacted positively in patch tests only to eugenol as an individual substance, not to fragrance mix I and temporary dental cement. The reason for this may be that certain components in the fragrance mix are present in insufficiently high concentrations for them to provoke a contact reaction in some patients. Thus it was found that more than 25 % of patients who tested negatively for fragrance mix I in patch testing had a contact reaction to isoeugenol as a single substance [19]. It is likely that, also in the case of our patient, insufficient eugenol was released from the temporary dental cement during 2-day testing on dorsal skin, compared with moist oral mucosa, to yield a positive test result.

OLR treatment consists of allergen avoidance, either by trial avoidance of the suspected medication or by removing or replacing the material in the oral mucosal region to which the individual has a contact allergy [1, 20]. Thus we recommended that our patient replace the existing cement with a eugenol-free cement; after following this recommendation, the patient reported an improvement in her symptoms. Unfortunately, she declined to attend the clinic for follow-up photodocumentation.

In summary, it is essential to always consider OLR in the differential diagnosis of lichenoid lesions of the oral mucosa. OLR can only be diagnosed on the basis of the overall picture gained from the patient history, clinical findings and allergy testing results. Care must be taken to ensure that the suspected contact allergens are also tested as single substances,

since sufficient test concentrations can often only be achieved in this way.

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Conflict of interest

The corresponding author states that there are no conflicts of interest.

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